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PERFORMANCE OF BROILER RABBIT (Soviet Chinchilla × Grey Giant) FED LOW GRAIN CONCENTRATE

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ABSTRACT : Twenty one broiler rabbits, weaned at 5 weeks of age were divided into 3 groups of 7 each on the basis of body weight in a randomized block design and fed isonitrogenous concentrate mixture(s) containing either 60, 40 or 20% crushed maize grain in group 1, 2 and 3 respectively, alongwith *ad libitum* kikuyu (*Pennisetum clandistinum*) green grass. In group 2 and 3 replacement of crushed maize was largely done with wheat bran which is available abundantly at lower cost in India. The experiment was continued for 8 weeks ; DM intake and body weight gain were recorded at daily and weekly interval respectively. Body weight gain (17.9 to 19.7 g/d), feed conversion efficiency (3.6 to 3.9), hot carcass weight (663 to 698 g), weight of internal organs (% of body wt.) and total dry matter intake (89.9 to 93.8 g/d) did not differ significantly (P>0.05) among 3 groups. However inclusion of high level of wheat bran (group 2 and 3) in the diet significantly (P<0.01) enhanced the digestibility of dry matter. Present study indicates that broiler rabbits can be reared satisfactorily on a low grain concentrate (containing only 20 parts of maize grain and up to 64 parts of wheat bran) supplemented with *ad libitum* green grass fodder.

RESUME : Performances de lapin de chair (Chinchilla Soviétique x Géant gris) nourris avec un aliment concentré pauvre en grain. *Vingt et un lapins de chair, sevrés à 5 semaines d'âge ont été répartis en 3 blocs équilibrés de 7 en fonction de leur poids vif; ils ont été nourris avec des aliments concentrés iso-azotés contenant 60% (groupe 1), 40% (groupe 2) ou 20% (groupe 3) de maïs grain; ils recevaient en même temps* ad libitum *de l'herbe kikuyu fraîche :* (Pennisetum. clandistinum). *Le remplacement du maïs a été effectué avec du son de blé abondamment disponible et peu coûteux en Inde. L'expérience a duré 8 semaines. La matière sèche ingérée a été enregistrée chaque jour et le gain de poids vif a été mesuré chaque semaine. Entre les trois groupes, le gain de poids vid (17,9 à 19,7 g/jour), l'indice de consommation (3,6 à 3,9), le poids de la carcasse chaude (663 à 698 g), le poids des organes internes (% du poids corporel) et la consommation totale de matière sèche (89,9 à 93,8 g/j) n'ont pas montré de différences significatives (P>0,05). En outre l'introduction d'un fort taux de son de blé (groupe 2 et 3) dans l'aliment augmente significativement (P<0,01) la digestibilité de la matière sèche. Ce travail montre que des lapins de chair peuvent être élevés de manière satisfaisante avec un aliment pauvre en grain (contenant seulement 20 parties de maïs en grain et jusqu'à 64 parties de son de blé) complémenté par du fourrage vert distribué* ad libitum.

INTRODUCTION

Recently rabbitry has been adopted and thriving well for the production of meat and fibre in India. The rabbits consume considerable amount of various types of green fodders as a sole feeding which may be economically used alongwith concentrate mixture for the feeding of broiler rabbits (CHEEKE, 1987 ; DESHMUKH and PATHAK, 1989 ; DESHMUKH *et al.*, 1990). Due to continuous increase in the human population it may be difficult to spare sufficient amounts of cereal grains for the feeding of farm animals, including rabbits. A study was therefore undertaken to evolve a low grain diet for the optimum broiler rabbit production.

MATERIALS AND METHODS

Twenty one male broiler rabbits (Soviet Chinchilla x Grey Giant), weaned at 5 weeks age, were divided into 3 groups of 7 each on the basis of body weight in a randomized block design and fed isonitrogenous concentrate mixture containing either 60, 40 or 20% crushed maize grain (Table 1) in group 1, 2 and 3 respectively, alongwith *ad libitum* kikuyu (*Pennisetum clandistinum*) green grass. In group 2 and 3 replacement of crushed maize was largely done with wheat bran which is a by-product of wheat flour industry. Rabbits were kept separately in four tier iron cages and fed individually as per NRC (1977) standards. Feed and dry matter intakes were recorded daily. The experimental feeding was continued for 8 weeks and body weight gain of each animal was recorded at weekly interval before offering feeds and water. A metabolism trial of 6 days collection was conducted in the same cages in the last week of the experimentation for measuring dry matter digestibility. Samples of feed offered and residue left were analysed for dry matter and chemical composition (AOAC, 1980). Four rabbits of each group were sacrificed at the end of experiment for recording the yield carcass, vital organs, skin and by-products following the standard indian procedure (DESHMUKH, 1989). Data were analysed by two way analysis of variance and the significance of the difference between means was determined as per SNEDECOR and COCHRAN (1968).

RESULTS AND DISCUSSION

The level of crude protein (CP) in three diets was as per the recommendations (NRC, 1977 ; DESHMUKH and PATHAK, 1991). The content of total carbohydrates and ether extract were also found to be almost similar among three diets (Table 1) except total ash.

Table 1 : Gross and chemical composition of concentrate mixtures (% DM basis)

Ingredients	Concentrate mixtures 1	2	2	Kikuyu grass
Gross composition				
Crushed maize grain	60.0	40.0	20.0	
Groundnut cake	15.5	12.0	9.0	
Wheat bran	17.5	41.0	64.0	
Fish meal	5.0	5.0	5.0	
Mineral mixture	1.5	1.5	1.5	
Common salt	0.5	0.5	0.5	
Chemical composition				
Crude protein	18.6	17.9	17.1	16.1
Ether extract	3.8	3.6	3.5	2.2
Crude fiber	4.3	6.2	8.1	26.8
Nitrogen free extract	67.5	65.1	62.9	44.7
Total ash	5.8	7.2	8.4	10.2

Table 2 : Mean values of body weight, growth rate, feed conversion efficiency, dry matter intake and its digestibility.

	Groups 1	2	3	± SEM	
Initial body weight (kg)	0.37	0.38	0.38	0.02	NS
Final body weight (kg)	1.48	1.42	1.39	0.02	NS
Body weight gain (g/d)	19.7	18.7	17.9	0.41	NS
Feed conversion ratio	3.59	3.70	3.86	-	-
Body weight during trial (kg)	1.43	1.37	1.35	0.02	NS
Dry matter intake (g/d)					
Concentrate mixture	48.0	44.4	45.0	2.1	NS
Green grass	45.8	47.1	44.9	2.0	NS
Total	93.8	91.4	89.9	3.2	NS
Per kg body weight	65.5	67.2	66.8	2.3	NS
Per kg $W^{0.75}$	71.6	72.5	71.9	1.9	NS
Concentrate:Grass ratio	51:49	48:52	50:50	-	-
DM digestibility (%)	67.50^a	73.05^b	74.25^b	0.91	P<0.01

Table 3 : Mean values of carcass traits on different diets.

Particulars	Groups 1	2	3	± SEM	
Slaughter weight (g)	1505	1445	1463	70	NS
Hot carcass weight (g)	698	688	663	51	NS
Dressing percentage	46.3	47.5	45.2	1.6	NS
Internal organs (% of body wt.)					
Liver	2.91	2.69	2.90	0.19	NS
Heart	0.74	0.69	0.60	0.12	NS
Kidneys	0.91	0.95	0.64	0.14	NS
Lungs	1.16	0.95	0.94	0.14	NS
By-products (% of body weight)					
Head	10.14	9.86	9.82	0.32	NS
Skin	10.90	11.30	9.76	1.04	NS
Gut with contents	24.79	22.77	26.55	2.20	NS

Dry matter intake from concentrate and green grass among 3 groups was found to be similar with comparable concentrate : roughage ratio. Similarly mean values of DM intake per kg body weight and per kg metabolic body size ($kg^{W0.75}$) were also comparable among groups. It indicates that feeding of low grain diets to the rabbits substituting maize grain with wheat bran had no adverse effect either on palatability of concentrate mixtures or total DM intake. The intake of DM per unit body weight was much higher as compared to New Zealand White rabbits fed composite dry mash containing wheat straw as a roughage (DESHMUKH and PATHAK, 1992) and it was not affected by the composition of the diets. This is probably because of the fact that in present experiment green grass was offered which is expected to be more palatable as compared to wheat straw containing dry mash. Moreover, it is also possible that broiler rabbits used in the present study probably had higher requirements in comparison to New Zealand White rabbits used by DESHMUKH (1989). The total dry matter intake of broiler rabbits is in agreement with the observations recorded by RAHARJO *et al.* (1988) where Flemish Giant x New Zealand White rabbits were given diets containing 0, 40, 60, 80 or 92.5% rice bran alongwith *leucaena*, cassava tops and elephant grass.

The dry matter digestibility was significantly (P<0.01) enhanced in group 2 and 3 where wheat bran constituted 41.0 and 64.0% respectively of the concentrate, mixture as compared to control group. Similar observations have been made by AYALA *et al.* (1991) and FRAGA *et al.* (1991) in New Zealand White x California rabbits. These workers used different sources of dietary fiber to provide 10% crude fiber and observed that the retention time and dry matter digestibility were significantly higher in groups fed agro-industrial by-products like rice hulls (54.16% CF and 19.2% lignin) as compared to alfalfa hay (23.28% CF and 5.54% lignin), etc...Wheat bran used in the present study is an agro-industrial by-product having 11.1% CF and 5.6% lignin which is much higher than 2.1% CF and 0.33% lignin in maize grain. This was probably the reason that despite of almost similar CF intake the digestibility of CF in wheat bran groups was substantially higher compared to maize fed rabbits.

The growth rate and feed conversion ratio among 3 groups (Table 2) were found to be similar (P>0.05) indicating that substitution

of maize grain by wheat bran had nod adverse effect either on growth performance or feed:gain ratio. RAHARJO *et al.* (1988) have also made similar observation with rice bran. These workers found no adverse effect in average daily gain and feed efficiency when they used rice bran up to 60% level in the diets of rabbits.

There was no significant effect of diets on the means carcass weight, dressing percentage ; weights of vital organs and by-products (Table 3). The carcass yield in 3 groups was comparable with the values reported by KIRTON *et al.* (1971) and DESHMUKH (1989). Average weight of various vital organs and by-products, their values as percentage of body weight and also carcass weight were within the range of earlier observations (OMOLE, 1977 ; FOMUNYAN *et al.* 1984 ; CHEEKE, 1987).

Present study indicates that broiler rabbits can efficiently be raised on low grain concentrate (containing only 20 parts of maize grain up to 64 parts of wheat bran) supplemented with *ad libitum* green grass fodder.

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